

## PMSTPCOL PEmails

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**From:** Govan, Tekia  
**Sent:** Thursday, July 23, 2009 5:54 PM  
**To:** 'Bense, Richard'  
**Cc:** STPCOL  
**Subject:** Draft RAIs  
**Attachments:** RAI 3145.doc; RAI 3186.doc; RAI 3173.doc; RAI 3177.doc

Dick,

Please review the attached RAIs. If you feel we need a conference call to clarify the requested information, please contact me. If a conference call is not needed (please send an email) I will continue the formal process of issuing the RAIs to STPNOC.

These RAIs relates to section 2.4 and 2.5.

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**Recipients:**  
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MESSAGE	555	7/23/2009 5:54:29 PM
RAI 3145.doc	44026	
RAI 3186.doc	33786	
RAI 3173.doc	30714	
RAI 3177.doc	30714	

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Request for Additional Information No. 3145 Revision 2

South Texas Project Units 3 and 4  
South Texas Project Nuclear Operating Co  
Docket No. 52-012 and 52-013  
SRP Section: 02.04.12 - Groundwater  
Application Section: FSAR 2.4S.12

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.12-\*\*\*

In its review of the applicant's responses to RAIs 02.04.12-08 and 02.04.12-26, and FSAR Rev 2 Section 2.4S.12.2.3, "Temporal Groundwater Trends", the staff noted that the applicant, STP, described Well 602A data as though it is presented in FSAR Rev 2 Figure 2.4S.12-23; however, the data is not presented in the figure. Revise FSAR Rev 2 Figure 2.4S.12-23 to include the Well 602A data.

02.04.12-\*\*\*

In the review of (1) the FSAR Rev 2 Sections 2.4S.12.1.4, "Site-Specific Hydrogeology" and 2.4S.12.2.2, "Groundwater Flow Directions", (2) the applicant's response to RAI 02.04.12-09, (3) amendments to FSAR Section 2.4S.12.2.2 noted in the applicant's responses to RAI 02.04.13-4 and 02.04.12-6, (4) revised responses to ER RAIs 02.03-07 and 02.03-08, and (5) remarks contained in the groundwater model development and analysis report (see Section 2.4 on site groundwater levels), the staff note that the reviewed sections, (i.e., FSAR 2.4S.12.1.4 and 2.4S.12.2.2), require update to include current site characterization information and conclusions with regard to plausible pathways, mounding, gradients (including those to southwest), and maps showing the full seasonal variation of groundwater levels. Note especially conclusions in response to ER RAI 02.03-07 (see "third step" on pages 4 and 5 of 6 where applicant acknowledges flow to southwest, mounding in both Upper and Lower Shallow aquifers, and communication with Kelly Lake to the southeast.) Note also that the labeling of FSAR Figure 2.4S.12-17 is either incomplete or illegible (labeling of aquifers and dates).

02.04.12-\*\*\*

In the review of the applicant's response to RAI 02.04.12-17, the staff noted that the applicant, STP, has assumed dilution of the tank volume in a substantial fraction of the building volume prior to its release. Staff does not view the dilution volume used as necessarily conservative and request the applicant provide a stronger rationale for adoption of the fraction of building volume applied. Since the normal groundwater level is above the level of the fractured tank, staff requests the applicant comment on the justification for using a fraction of building volume instead of the room that contains the tanks for dilution for conservatism.

In addition to the proposed text changes to Section 2.4S.13.1.2, some update to Section 2.4S.12.3.1, "Exposure Point and Pathway Evaluation", is necessary to reflect the logical

inclusion or elimination of pathways. These revisions should also treat the pathways identified as plausible in Section 2.4S.12.2.2, "Groundwater Flow Directions", and Section 2.4S.12.2.3, "Temporal Groundwater Trends".

Please amend the response on chelating agents to include the citation for "Reference 2" (cited on page 3 of 7 of the response to RAI 02.04.12-17 but not listed in references).

#### 02.04.12-\*\*\*

In the review of the applicant's response to RAI 02.04.12-17, including review of FSAR Rev 2 Sections 2.4S.12.3.1, 2.4S.12.3.2, and 2.4.S.13.1.2, and the response to RAI 02.04.12-1, the staff noted the applicant has considered information in the Annual Environmental Operating Report (no specific report cited) to determine the site conceptual model. In staff's review of the applicant's Annual Environmental Operating Report for 2006 (issued April 2007), staff note that sixteen shallow aquifer wells were sampled for various radionuclide concentrations within the Protected Area. Since some values were detected above laboratory detection limits but were below the EPA drinking water standard, the following information is requested: Provide the well location and screen depth/interval of all wells that drew samples from the Upper Shallow Aquifer (or a relatively shallow depth near the facilities) and the location and screen depth/interval of wells that drew samples from the Lower Shallow Aquifer (or a relatively deep depth near the facilities). Comment on whether these data support or refute the assumption that releases will be forced downward into the Lower Shallow Aquifer by a downward hydraulic gradient. Revise the site conceptual model described in Section 2.4S.12.3.1, "Exposure Point and Pathway Evaluation", and Section 2.4S.13.1.2, "Conceptual Model" to reflect these observed contamination levels, their relative position, and whether they support or refute the existing conceptual model, (i.e., groundwater contamination moves from Upper to Lower Shallow Aquifer).

#### 02.04.12-\*\*\*

In the review of the applicant's response to RAI 02.04.12-18, the staff noted that the applicant, STP, refers to the future incorporation of changes to FSAR Sections 2.4.12 and 2.4.13 when "NRC commitment COM 2.4S-2" is complete. COM 2.4S-2 is in reference to changes to the application to reflect groundwater level measurements collected and analyzed for one year of data from STP 3&4 observations wells. In the RAI response STP also committed to incorporating groundwater pathway changes including a point of exposure on the property line, (i.e., a groundwater well supplying domestic water). STP states that this will involve changes to Subsections 2.4S.12.3.1 and 2.4S.12.3.2, and Table 2.4S.12-17 as well as FSAR Section 2.4S.13. The staff request that the proposed changes to specific sections, tables, and figures be provided.

Any calculation packages associated with the new point of exposure be made available for staff review.

Regarding the commitment to incorporate changes in groundwater pathways, in the review of the applicant's revised response to ER RAI 02.03-07 and Safety RAI 02.4S.12-20, the staff noted that communication between Kelly Lake and the Upper Shallow Aquifer, and the upward gradient between the Lower and Upper Shallow Aquifers imply

that Kelly Lake is a plausible exposure pathway for both the Upper and Lower Shallow Aquifers requiring evaluation in Section 2.4S.12.3.1. Staff request that the FSAR be revised to include this pathway.

02.04.12-\*\*\*

In the review of the applicant's response to RAI 02.04.12-20, the staff noted the applicant, STP, (1) did not provide a copy of Figure 2.4S.12-XB, (2) noted the application of Visual MODFLOW to create and apply a site-specific groundwater model, and (3) commitment to future FSAR revisions that were not provided. The staff request (1) a copy of Figure 2.4S.12-XB, (2) copies of input and output representative of the Visual MODFLOW simulations completed and significant to conceptualizing the site and simulating plausible alternative transport pathways applied in FSAR Section 2.4.13, and (3) copies of proposed revisions to FSAR Sections 2.4.12 and Section 2.4.13 text, tables, and figures in response to RAI 02.04.12-20 and the completed groundwater model simulations.

02.04.12-\*\*\*

In the review of the document "Groundwater Model Development and Analysis for STP Units 3&4" provided as part of applicant's response to RAI 02.04.12.20, the staff noted that while the purpose of a groundwater flow model for a site goes beyond just calibration, one of the primary bases for determining a model's reliability to predict post-construction conditions is documenting its ability to reproduce existing field observation. The staff conclude from the review (of the FSAR Rev 2 Sections 2.4S.12 and 2.4S.13, and RAI responses including 2008 data and interpretations) that among the critical observed field conditions not reproduced by the existing model one must include (1) a groundwater divide in the Upper Shallow Aquifer in the immediate vicinity of the proposed location for STP Units 3&4, (2) a groundwater divide (that can not be excluded) in the Lower Shallow Aquifer in the immediate vicinity of the proposed location for STP Units 3&4, and (3) an exposure pathway in the vicinity of Kelly Lake where there is an upward gradient from the Lower to the Upper Shallow Aquifer and the Upper Shallow Aquifer is hydraulically connected to Kelly Lake. Provide either 1) a revised conceptual model to better represent the current observed field conditions, a revised numerical model, its revised results and conclusions, and proposed changes to the FSAR Sections 2.4.12 and 2.4.13, or 2) a justification of why these inconsistencies between observations and model predictions do not make the model unreliable for these assessments.

Reference: "Groundwater Model Development and Analysis for STP Units 3&4", South Texas Project, U7-C-STP-NRC-080070, Attachment 2, by Bechtel Power, December 2008.

02.04.12-\*\*\*

In the review of the applicant's response to RAI 02.04.12-26 (as well as responses to RAIs 2.4.12-09, 2.4.13-05, and 2.4.13-06), the staff noted there was no mention of the potential to apply the STP site groundwater model of the Upper and Lower Shallow

aquifers to evaluate the post-construction setting and support the conclusion that a permanent dewatering system is not needed and that the DCD requirement of maximum allowable hydraulic head will not be exceeded. Provide a justification for not using the STP groundwater model, a revision of it, or a simpler model to incorporate the potential changes in hydrogeologic strata, hydraulic properties, and recharge rates in a post-construction setting, and to quantify the possible change in groundwater elevation in the vicinity of safety related structures for proposed Units 3&4.

02.04.12-\*\*\*

Instead of echoing the plant parameter "61.0 cm (2 ft) below grade" by rephrasing it as a site characteristic "> 61.0 cm (2 ft) below grade", NRC staff request a true site characteristic be assigned to the "maximum groundwater level" that provides some margin between site characteristic and the plant parameter. Also, with regard to the plant parameter for maximum groundwater level, clarify the "grade elevation" which is noted to be 35 ft MSL in Section 2.4S.12.5 and used to define the maximum groundwater level in the plant parameter, versus the "plant grade" which is defined to be 34 ft MSL in other subsections of Section 2.4S and elsewhere in the FSAR. Since the grade within the powerblock varies from 36.5 to 32 ft MSL and the selection of 35 ft MSL seems arbitrary, why isn't the more rigorously defined and repeatedly cited "plant grade" used to define the maximum groundwater level?

02.04.12-\*\*\*

This three-part RAI is a result of inconsistencies that have appeared between the Rev 2 versions of the ER and the FSAR with regard to groundwater usage. (1) In the review of FSAR Rev 2 Sections 2.4S.12.1.6, "Plant Groundwater Use" and 2.4S.12.3.3, "Plant Groundwater Use and Effects", the staff noted that the normal and peak groundwater rates provided in the FSAR are not the same as those appearing in the ER Rev 2 Section 3.3, "Plant Water Use", and ER Rev 2 Table 3.3-1, "STP 3 & 4 Water Flow Table". This also calls into question the expected range shown in the FSAR section. If the FSAR Rev 2 Sections referenced above are correct, so state; if not, correct and identify the source of the new water flow rates.

(2) The ER Rev 2 states that any groundwater source requirement beyond the permitted rate of 1860 gpm (3000 ac-ft/yr) will be obtained from the MCR (see ER Rev 2 Section 5.2.2.2). If this is true, then for consistency with the ER and clarity with regard to groundwater use, the FSAR should note the intent to not exceed the permitted limit of groundwater withdrawal, i.e., 3000 ac-ft/yr in FSAR Sections 2.4S.12.1.6, "Plant Groundwater Use" and 2.4S.12.3.3, "Plant Groundwater Use and Effects".

(3) The last sentence in the third paragraph under Section 2.4S.12.3.3 beginning "Peak demand..." needs to be clarified. If only use MCR water will be used to supplement the groundwater supply whenever necessary, as is indicated in ER Section 5.2.2.2, then so state. However, if the FSAR statement "by increasing the permitted groundwater allotment for short-term uses" is an intended path forward, then it requires an explanation of the process to be followed to obtain the increased allotment, and the increased permitted level being sought as well as its duration of use.



Request for Additional Information No. 3186 Revision 0

South Texas Project Units 3 and 4  
South Texas Project Nuclear Operating Co  
Docket No. 52-012 and 52-013  
SRP Section: 02.05.02 - Vibratory Ground Motion  
Application Section: 2.5.2

QUESTIONS for Geosciences and Geotechnical Engineering Branch 2 (RGS2)

02.05.02-\*\*\*

In responding to RAI 2.5.2-13, you indicated that a SSHAC level two study was conducted in characterizing the Gulf Coastal seismic source. Please describe how the experts' opinions were integrated into the development of the final Gulf Coastal source model, how any conflicting opinions between the experts were dealt with, and how the final source model represents the informed consensus of the community?

02.05.02-\*\*\*

In responding RAI 2.5.2-15, you indicated that the magnitude for the hypothesized seismic sources associated with the liquefaction features found in the Arkansas and northeastern Louisiana are too small (approximately M6) and the distances too far from STP Units 3 and 4 (over 600 km) to have a significant impact to the site seismic hazard. Studies of these features have indicated the potential for earthquakes larger than magnitude 6. Please clarify the basis for your conclusion that the earthquakes are approximately 6.

02.05.02-\*\*\*

In responding to RAI 2.5.2-18, you attached a paper, entitled "Random Vibration Theory Based Seismic Site Response Analysis." Presumably, the soil profile included in the paper is STP Units 3 and 4 site-specific soil profile. The profile has 15 layers characterized by different parameters. However, it does not match the detailed description of the soil layers underneath the site (from layer A to N) described in Section 2.5S.4. Please explain the discrepancy and provide site-specific soil property data to facilitate the staff's confirmative analysis. In addition, provide more details regarding the RVT methodology in FSAR.

02.05.02-\*\*\*

Based on Section 2.5S.2, the EPRI SOG ESTs either assigned low maximum magnitudes and low probabilities of activities or provided no source coverage to the area located in the northwest corner of the site region (see FSAR Figure 2.5.2-8). With the result that the hazard contribution from this area is less than or equal to 1%. Please

justify this lack of coverage and whether the EPRI SOG source models adequately characterize the hazard surrounding the site.

02.05.02-\*\*\*

In Section 2.5S.2.5, you mentioned that  $V_s = 9200$  fps “is located at more than 30,000 ft (9144 m) below the ground surface.” However, Figure 2.5.4-57 in Section 2.5S.4 indicates that below 2500 ft, the  $V_s$  is about 9200 ft/s, and in the FSAR Com 2.5 S-1, you also indicated that “below 2500 ft depth, a hard rock shear wave velocity of 9285 ft/s was assumed.” Please clarify this discrepancy.

02.05.02-\*\*\*

FSAR Com 2.5 S-1 states that you replaced site-specific soil profile below the depth of 600 ft with a new profile converted from P wave measurements from oil exploration data. Please describe the corresponding changes to the Kappa value because of this new soil profile.

02.05.02-\*\*\*

Since Sections 2.5S.2.5, “Seismic wave transmission characteristic of the site” and 2.5.S.2.6, “Ground Motion Response Spectra” have been modified significantly, please provide complete updated FSAR contents for those sections, including all the supporting figures and tables, such as GMRS,  $10^{-4}$  and  $10^{-5}$  UHRS and other related tables.

Request for Additional Information No. 3173 Revision 2

South Texas Project Units 3 and 4  
South Texas Project Nuclear Operating Co  
Docket No. 52-012 and 52-013  
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations  
Application Section: 02.05.04.10

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

02.05.04-\*\*\*

In response to RAI 2.5.4-15, you provide a brief description of the calculation procedure used to determine the dynamic bearing capacity, but you did not report the calculated factor of safety for the safety-related structures under SSE dynamic loading. Similarly, in the mark up of the FSAR submitted as response to question RAI 2.5.4-13, Supplement 1, FSAR subsection 2.5.4.10.3 does not indicate the factors of safety calculated for the safety-related structures. Additionally, reference was made to a criterion factor of safety of 1.5 when dynamic or transient loading conditions apply. The staff has two questions related to this RAI response.

1. What are the factors of safety for STP Units 3 and 4 safety-related structures under the dynamic SSE loading?
2. Given that reference 2.5S.4-69 is a 1980 era document, and higher factors of safety are being applied by other applicants, please justify the use of a factor of safety of 1.5 for STP Units 3 and 4.

Request for Additional Information No. 3177 Revision 2

South Texas Project Units 3 and 4  
South Texas Project Nuclear Operating Co  
Docket No. 52-012 and 52-013  
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations  
Application Section: 2.5.4.10

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

02.05.04-\*\*\*

The response to RAI 2.5.4-21 states that the following language will be added to the FSAR, " Construction sequencing will be necessary to address the time-rate of settlement for the Category 1 structures...." and "The acceptance criteria for settlement of Category 1 structures will be developed during design of these structures and will be consistent with the DCD." The staff finds this level of detail vague and requests that you provide more information.

1. Please elaborate on your means of using construction sequencing to evaluate time-rate of settlement.
2. Please provide your settlement criteria for fuel loading. How will you ensure that settlements after fuel loading will not be damaging settlements?
2. Please define the specific DCD acceptance criteria that you will follow.